THE COLORADO MAGAZINE
Published bi-monthly by
The State Historical Society of Colorado

Vol. XXV Denver, Colorado, May, 1948 No. 3

Major Hough's March into Southern Ute Country, 1879

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On the 29th of September, 1879, the White River Agency in Northwestern Colorado was attacked by the Northern Utes in what appeared to be a general uprising of the Indians in that area. The agent, Nathan C. Meeker, and eleven of his employees were killed, while the female residents of the Agency were carried off by the attackers. On the same day Major T. T. Thornburgh, who was marching from Fort Steele, Wyoming, with a detachment of 150 men to assist Meeker in controlling his charges, was ambushed and killed as he was nearing his destination. The news of the Meeker massacre and the Thornburgh ambush caused great alarm among the whites in Colorado and within a few days federal troops began to enter the state in numbers.[1] Led by General Wesley Merritt, cavalry and infantry units left Rawlins, Wyoming, on the 2nd day of October and by the 5th had relieved the besieged Thornburgh detachment, driving the Indians farther back into the mountains. As the Interior Department wanted to negotiate with the Indians, Merritt now suspended active military operations but remained on the scene to check any further depredations.

At the same time that troops marched into Northern Ute country, Army authorities ordered other soldiers to the Southern Ute area, in Southwestern Colorado, directing them to keep these Indians under control and be prepared, if necessary, to march against the Northern Utes. Among these troops were four companies of the 22nd Infantry, commanded by Major Alfred L. Hough, who was at the time of the Meeker massacre stationed at Fort Gibson, Indian Territory. This fifty-six-year-old officer had

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[1]General W. T. Sherman estimated the population of the four bands of Utes to be about 4,000, of whom 800 were considered to be able warriors.

seen his first active military service during the Civil War as a Sergeant in the 17th Pennsylvania Volunteers and later as a Captain in the 19th Infantry. The War's end found him with the rank of Brevet Major, as an *Aide de Camp* to Major General George H. Thomas, Department of the Cumberland. He participated in campaigns against the Sioux in 1876 and 1877. During the summer of 1879 he was in command at Fort Gibson, Indian Territory, and was ordered from there to Colorado on October 4th. His command travelled by rail to Alamosa, Colorado, which was as far west as the Denver and Rio Grande Railroad had then been built. From there his men marched through the mountains to Animas City, where they encamped until January of 1880. Several months after completing his assignment, Major Hough wrote an account of his march, using the letters he had written to his wife as reference material, and although he could write of no fighting with the Southern Utes, he has left an interesting description of a rapidly developing part of Colorado. The following account is taken from the manuscript copy of Major Hough's autobiography, and from letters written by him during the autumn of 1879, both of which are now in the possession of his grandson, John N. Hough, Professor of Classics in the University of Colorado.[2]

The summer [1879] was exceedingly hot, and besides necessary movements in my investigations I remained quietly at Fort Gibson until October. On the first day of October I was at Muskogee at the International Fair of the Five Nations, at which the Hon. Carl Schurz, Sect. of the Interior, was present. The day before he had received a telegram informing him of an event which had shocked the whole nation, the killing of Maj. Thornburgh and part of his command while marching to the White River Agency in Colorado for the protection of the Agent and the supposed massacre of the Agent Mr. Meeker and his attaches.

On the next day I received a telegram from Dept. Headquarters directing me to hold myself and command in readiness for temporary field service in Colorado. I of course knew the cause for it and was soon ready. On the morning of the 4th I received orders to march and in four hours my command of four companies of our Regt.[3] were on the cars at Gibson Station. I left one officer and ten men to take care of the Post, and my family with oth-

[2]One characteristic of Major Hough's writing was his habit of running sentences together, separated only by commas. The editor has inserted sufficient conventional punctuation to facilitate the reading of his narrative.

[3]The 22nd Infantry.

ers remained there. Thus, after a scorching summer in the South from out of the winter's ice in the North, were we now, when the pleasant season was approaching, leaving it for a mountain region amidst snows, for the winter. I bid goodbye to my dear wife and daughter once more, and for an unknown time.

I was ordered to report to Fort Garland, Col. We reached there, via Emporia, Kansas, and Pueblo, Col., at 4 a. m. on the 7th. Leaving the troops in the cars near the Post, I with one officer stumbled through the dark to the Post, which seemed deserted, as I encountered no sentinels, and saw no lights. At last I met a son of Africa who hailed me and informed me he was a soldier and was the watchman for the night, that there were only a half a dozen soldiers there, and one Lieutenant who had orders for me. I was conducted to the quarters of the Lieutenant, who had heard the whistle of our engine and had gone to meet me; my guide built a fire, for the night was cold, and the Lieutenant, Mr. Pogue, soon returned with two of my officers, and for an hour we were hospitably entertained, and my orders were handed to me; after which I went on with my train.

Thus was my singular entry into and exit from Fort Garland, of which I saw nothing but Lt. Pogue's quarters.

My orders were to proceed to Alamosa, the end of the D. and R. G. R. R. and then report to Gen. [Edward] Hatch, Comdg. Dept. of New Mexico. On arriving there soon after daylight I reported to the General who had come there the day before from Santa Fe to fit out an expedition. One company of Mounted Infty, Capt. Bradford's of the 19th, was there. On my arrival, Gen. Hatch had it report to me, and ordered me to proceed to Fort Lewis,[4] Pagosa Springs, as soon as transportation could be hired, which was done that day. In the meantime we went into camp on the banks of the Rio Grande, which here is a beautiful mountain stream. Alamosa is a new town at the present terminus of the road situated on a plain on the right bank of the Rio Grande.[5] On the morning of the 8th we left Alamosa with very inadequate directions to march slowly so as not to get ahead of our supplies which would follow us; we carried ten days rations.

This day's march did not promise well for the success of our expedition if omens should be recognized, as it was a series of

[4]Not the present site of Fort Lewis. By authorization of Congress a military post was established at Pagosa Springs in October, 1878, and was named after Lt. Col. Lewis of the 19th Infantry, who had lost his life the previous summer fighting the Cheyenne Indians. Later a new site was selected farther west and a new fort was completed in the autumn of 1880. (Ayres, Mary C., "History of Fort Lewis, Colorado," in *The Colorado Magazine*, VIII, 81-92.)

[5]Established in 1878, about the time of the arrival of the Denver and Rio Grande Railroad.

blunders. My orders were to proceed to Conejos, 32 miles in two days, to which place two roads lead; the western one I was to take. I sent off the mounted troops first, and soon after the Infantry under Capt. Dickey, while I reported to General Hatch, I having a spring wagon in which I travelled with my adjutant, quartermaster, and surgeon, there being no horses to be had for us to ride; my own having been left at Fort Gibson as transportation for them was refused.

About two hours after the column started I followed on the western road across the plains, and was surprised at not overtaking Capt. Dickey. Upon arriving at La Jara I found Capt. Bradford in camp, but he had seen nothing of the infantry column. Knowing they must have taken the other road I sent my adjutant Lt. Casey and Lt. Ogle of Capt. Bradford's company across the prairie to find them and they did not return. After waiting until midnight I rolled myself in my buffalo robe and went to sleep in Capt. Bradford's tent. The night was cold, ice formed a fourth of an inch thick which showed a rugged change from Gibson with the mercury at 90 when we started.[6] We marched at daylight next morning, and after proceeding about a mile met Lieutenants Casey and Ogle, who looked miserable enough; they had found Capt. Dickey in camp on the river road all right, and after giving him my orders and fortunately for them, getting supper, they started to come back to our camp, but got lost on the prairie and had wandered about all night. They had no matches with them and could make no fire, had no wraps and could not lie down, but had to keep on the move to keep warm trudging through the sage brush and leading their horses. As day dawned they saw our camp and were coming toward it when we met the forlorn couple. Capt. Dickey had been put on the wrong road by the teamster who was to guide him.

At Conejos that afternoon we joined and went into camp on the banks of the Conejos river, a beautiful stream, for our supper. "All is well that ends well." But I could not but reflect that many military projects on a larger scale than this and upon the results of which the fate of armies has depended, have often failed from just such blunders or accidents as this one; and this incident goes to show that too much precaution cannot be taken in military movements to avoid miscarriages.

Conejos is an old Mexican town with a few modern houses in it, these springing up on the prospect of the railroad reaching it which will be soon. Most of the houses are of adobe. It has a

[6]After having spent a cold night, Major Hough wrote to his wife from Conejos, Colorado, and asked her to send him a Buffalo overcoat, leggings, woolen socks, a fur cap, and "two full suits of red underwear." (Alfred Hough to Mary Hough, October 9, 1879, Hough Papers.)

large church and monastery all of adobe. This was the first Mexican town I had seen, and I was much interested in seeing the natives standing in the sun beneath walls as I have heard described. I saw nobody at work, the men were all sunning themselves under walls, the women sitting in doorways with shawls over their heads. No attempt at ornamentation to be seen anywhere, no flowers, and no grass; only some trees relieved the scene from absolute desolation. This description will do for all Mexican towns I saw afterwards, except that I saw no trees thereafter. This being a forage station, we replenished forage and went on early on the 10th. Before starting I received instructions for our march by courier from Genl. Hatch; they were as follows—After stating that a Company of the 9th Cavalry would overtake and report to me, that a Company of the 15th Infty. from Santa Fe would meet and report to me on the Navajo river en route, and that forage would be supplied by forage stations on the way, it further stated, "it is important on your line of march on approaching the Chama river, and from there to Fort Lewis to thoroughly examine the canyons before entering with main column, by careful reconnaisance and in passing them to take intervals between companies or wings of the column of 500 yards."

While at Conejos news came confirming the massacre at White River, and we felt that our services would be needed before the many difficulties caused by this outrageous occurrence would be settled.

We marched this day 11 miles up the right bank of the Conejos river, passing through several Mexican villages and went into Camp on a plain near the river on which were five large cottonwood trees.

Left camp on the 11th and struck directly into the mountains over a toll road, but a rough one; crossed a high divide between the Conejos and Los Pinos creek, the highest point on the road being 10,500 feet. After making a quick descent from the crest of the mountain, almost down a precipice, we crossed a branch of Los Pinos creek and again descended and camped at the toll gate, a rough shanty where a lonely wretch remains during the summer to gather tolls from wayfarers. The place is well located for no other roadway remains to travellers across the mountains; they must pay tribute here. The toll gatherer was making preparations to leave, for during the winter this pass is blocked with snow. We camped at an elevation of 10,100 feet. The march was a delightful one, grand mountain scenery in the distance, and our road generally winding around through small open valleys, but no canyons. The weather was perfect. The mountain sides are covered with large pines, as are some of the

valleys also, while others are open and covered with grass in which sheep are herded. Los Pinos creek immediately below our camp enters into a Grand Canyon, through which the D. and R. G. R. R. were trying to locate the road, but had not then succeeded. The canyon from our camp, looking down through it, was wild and grand in the extreme; trout cannot ascend the streams through the canyon while there are plenty below it. We found abundance of trout in all the streams and had plenty on our tables.

Captain Parker's company of the 9th cavalry reported to me en route, having left Alamosa a day after we did. These were the first colored troops our men had ever seen but there was no demonstration at the meeting besides some looks of wonder and surprise, and from that time on there was never any difficulty between our men and them.

We left Los Pinos creek next morning and marched across the divide to a branch of the Chama, Wolf Creek, a distance of 13 miles. The scenery this day was of bold high mountain peaks in the distance and our road through canyons and pine forests, all at high elevation. I marched this day with great care, having my cavalry in front examining the sides of the canyons. Up to this time the weather had been cold since arriving in Colorado. We now had a change, it being mild and pleasant. A party of railroad surveyors were in camp on Wolf Creek from whom I got much information about the country and prospects of seeing hostile Indians. They were quite nervous about Indians and were glad to see us going on ahead of them.

On the 13th we marched down Wolf Creek and crossed the Chama, where I met some wagons which had been sent from Fort Lewis to meet me to take the place of the citizen teams I had. We heard from the teamsters startling rumors of outrages in Animas valley from Indians, but nothing positive. All this we ascertained afterwards was manufactured for the purpose of securing troops to come into the valley to make a market for their produce.

On the 14th we crossed the continental divide and were on the Pacific watershed, but the elevation was not as great as we had passed before reaching the Los Pinos. We then crossed the Navajo and camped on the little Navajo in the midst of a pouring rain, which afterwards flooded our camp and compelled the removal of some tents to higher ground. There was little sleep for many that night, but I must confess to my sleeping soundly through the night, and was ignorant of the troubles of some of my comrades.

Through all the country the scenery is much the same, hills and valleys covered with large pines, and mountain streams in the valleys; great numbers of sheep were being herded in the

valley. This pine forest extends all the way over to the La Platea [La Plata] river.

On the 15th I sent the cavalry ahead with directions to scout well in front and go on into Fort Lewis. With the infantry I marched through a beautiful canyon down to the Rio Blanco and went into camp on its bank. In the narrowest part of the canyon we overtook a Mexican ox-train; the wagons had slipped off the grade and were stuck in the mud. We had to unload and carry the wagons out of the defile before we could pass with our train. Genl. Hatch and staff overtook us this day and went on to Fort Lewis [Pagosa Springs]. He was complimentary in his remarks as to our marching; I was glad he was satisfied for I was not entirely myself. Our campground this night on the banks of the Blanco was well strewed with pine knots and the men got well dried out at the roaring fires they made. It was a weird scene with the nearly nude men drying their clothing before the bright fires.

OLD FORT LEWIS ON THE PRESENT SITE OF PAGOSA SPRINGS. THIS WOODEN FORT WAS THE SUCCESSOR TO OLD FORT GARLAND WHICH WAS ABANDONED IN 1883, BY THE ARMY.

On the 16th we left the Blanco and crossing a small divide went into Fort Lewis on the San Juan and reported to Genl. Hatch, who directed me to go into camp near the post. The next day we rested in camp and looked about Fort Lewis and Pagosa Springs. The springs are truly wonderful. A boiling sulphur spring of irregular form some 60 or 70 feet in circumference [is] situated at the apex of a slight elevation from the surrounding plain, and at a short distance from the San Juan river. The elevated ground is of a rocky substance, apparently formed by a deposit from the spring, though I am not geologist or mineralogist enough to know.

It contains numerous fissures and underground passages through which the water runs from the spring to the river. The San Juan is a fine mountain stream and very cold, though sufficient water runs from the spring into it to modify its temperature, so much so I am informed, that in the winter, while it may be frozen sufficiently hard for teams to cross upon above the spring, it will be open for some distance below it. The whole appearance of the spring with the numerous openings, and fissures around it, immediately on which the vapor condensed into heavy columns of mist, reminded me of one Dore's scenes in his illustrations of Dante's Inferno where the hell of boiling springs is shown. Nature though was being despoiled of its beauty by a new town of board shanties, which were being built near to the springs, between them and the timbered hills which bound the valley of the San Juan. Bath houses were already erected, and at no distant time, after the railroad reaches this place, it will no doubt be a resort for invalids. Fort Lewis which is on the opposite side of the river is a newly built log cantonment and is not likely to be a place of much military importance.

In the afternoon the chiefs of the Southern Utes came in and held a council with Genl. Hatch at which I was present as a "war chief." The Indians expressed great sorrow for the misconduct of the Northern Utes, and declared they had no sympathy with them, that they were peaceful Indians and wanted to know why troops were brought into their country. The Genl. told them he had come this way to be prepared to meet the Northern Utes if they should come south and that they must not harbor any of them. They said they would not. It was evident they were much worried at seeing the troops and no doubt our coming into the country prevented the young men from going north to aid the White River Utes. There was much speech making by the representatives of the three tribes or bands of Southern Utes, the Winnemuches [Wiminuches] the Moaches and Capotes, the speakers for which were Alhandra, Savaro, and Kaneache. The speaking by all but Savaro was in Ute; he spoke Spanish and translated for the others to our interpreter who spoke Spanish and English. There was eloquence in their manner of delivery and I wished I could have understood them. I saw that universal Indian trait of pretending not to understand English for when Genl. Hatch said some things tending to arouse them, their faces showed they understood him. They did not want the soldiers to go any further into their country, but the General told them he would go on and would stay until the White River murderers were punished which had a great effect upon them. Ignatio [Ignacio], the Chief of the Winnemuches and the most powerful man among the Southern Utes, was not present, his lieutenant Alhandra representing him. Ignatio had gone to meet Col. [George P.] Buell who was marching from Fort Wingate N.M. to meet Genl. Hatch with a column of troops from that post. The council was impressive and interesting.[7]

Capt. Bean's [?] company of the 15th Infty. from Santa Fe which had passed the Navajo before I got there was at Fort Lewis and was now assigned to my column. I then received orders to march next day and proceed to Animas valley. I here succeeded

CHIEF IGNACIO OF THE SOUTHERN UTES.

BUCKSKIN CHARLIE, SUCCESSOR TO OURAY.

in getting a mule for my mount, and faithful old Jack carried me safely and gently through the campaign from here, and many times when on sides of steep hills I rejoiced that I had left my horse behind. On the 18th we marched to Stollsteimer's Ranche, a pretty spot in the mountains where there was a fine spring, and on the 19th to the Piedra river through mountain valleys, seeing in the distance a succession of beautiful peaks called the Needles from their sharp pointed summits. On the 20th we marched to King's Ranche—a rude ranch in the hills—and on the 21st to Los Pinos river where we found a cultivated valley, the first since leaving the Conejos; and passed on to the Florida, another pretty valley

[7]After the conference that day Major Hough wrote to his wife that the Indians " . . . declare they are not in sympathy with the Northern Utes and do not want to fight. They were very humble, and all *looks* well but still we will be vigilant." (Alfred Hough to Mary Hough, from Fort Lewis, Colorado, October 17, 1879, Hough Papers.)

and cultivated, where we camped. I here found an old soldier of the Army of the Cumberland in possession of a fine farm, and at the sight of us he gave a "hurrah" and had much to say about the "old times of the war." On the 22nd we marched to Animas[8] and went into camp. Genl. Hatch came on later in the day and made his headquarters in the village.

Our whole march from Alamosa was 180 miles and in all my experience I never campaigned through a country so beautiful, mountains, forest, valleys, clear rushing water, everything to make nature lovely, and here in Animas valley we found quite a large settlement and a thriving town. The Indian scare if there had been one was over, and all anxiety of the inhabitants seemed to be centered on trying to make as much money out of our coming among them as was possible. The day after our arrival Genl. Hatch received instructions that an investigation of the affair at White River had been ordered and all military operations would cease till an effort for peace had been made. We therefore went into a permanent camp and made ourselves as comfortable as possible. Subsequent instructions were received for us to remain at Animas, and if the efforts for peace failed, Genl. Merritt on the North, Genl. [R. S.] McKenzie on the East from Fort Garland and our column from the South under Genl. Hatch would begin active operations.

On the 31st Genl. Hatch received orders detailing him as President of the Commission to attempt to settle this affair without war. Thus have these Indians by boldly resisting the government brought it to negotiate; if they had been a weak tribe our magnanimous government would have crushed them at once. Indians who will fight are always better treated than those who submit, and Indians know from experience that if they can successfully commit a depredation, killing a number of people and robbing some stock, do enough to compel the government to proceed against them, they are safe as to a settlement of the trouble by a concession to them. In other words it does not pay them to be peaceful.[9]

[8]About three miles from the site of the present city of Durango.

[9]A soldier's opinion of the federal Indian policy is further shown in one of Major Hough's letters home. "This campaign has fizzled terribly—with Merritt in the North, and we here, the Army is in a position to control the Utes, and a war with them is only a matter of time. I don't care how much of a peace they may patch up now, every man, woman and child in Colorado are [sic] in favor of removing the Utes and they will force it and bring on a war sooner or later. The Indian problem as I have seen it is plain to me here; there are several Indian wars near at hand and cannot be stopped. You say the Southern Utes are peaceable. So they are because we are here, and they have not been interfered with, but when it comes to removing them they will fight for their homes. Our whole Indian policy is a mere system of make-shifts and must result in much bloodshed in the end. I have not much comfort in looking at it." (Alfred Hough to Mary Hough, from Animas City, Colorado, October 26, 1879, Hough Papers.)

Genl. Hatch left at night immediately after Col. Buell arrived from the La Platea [La Plata] valley. Buell relieved Hatch and the next day his column of three companies joined mine.[10]

Animas City was at that time a pioneer mining town with great expectations, and as the D. & R.G.R.R. Co. promises to have the road reach the city by next August,[11] prospects are good for their expectations being realized, as there are rich but undeveloped silver mines in the mountains near, and Animas valley is a good place for a town. The climate is compensatingly mild and pleasant with short winters.[12]

We staid in camp at Animas two months; and two months in tents in winter expresses a deal of discomfort, of this we had our share. More than the usual amount of snow fell; at times it was two feet deep around us and then it would be mild and snow again. We had some very cold weather, the mercury falling to –20, but we had no actual suffering, there being plenty of wood, and part of the time we had stoves. After the stoves came to us, and large Sibley tents, [13] our camp was often a scene of hilarity. On pleasant nights the camp resounded with songs, and the "colored troops" were mighty with instrumental music. Many of the officers and men hunted and fished with great success, trout and venison were common food for us, the time afforded some society. On the whole the memory of Camp Animas is pleasant. Col. Buell remained at Head Quarters in the town leaving me in command of the whole camp of ten companies, giving me something to occupy my time much to my satisfaction. We had but one exciting occurrence during the winter; and that the cow-boys from the surrounding ranches af-

[10]The troops now under the command of Col. George P. Buell were comprised of Major Hough's four companies of the 22nd Infantry, two companies of the 15th Infantry from Fort Wingate, one company of the 19th Infantry from Fort Lyon and four companies of the 9th Cavalry from Pagosa Springs. The total number was about 600 men. In January of 1880 the entire group, with the exception of the 15th Infantry, which went to Pagosa Springs, left for Santa Fe. (Ayres, Mary C., "History of Fort Lewis, Colorado," in *The Colorado Magazine*, VIII, 85.)

[11]The Denver and Rio Grande Railroad reached Durango, three miles from old Animas City, on July 27, 1881. The town of Durango did not yet exist in the fall of 1879, it being first laid out in September of 1880. (Frank Hall, *History of the State of Colorado*, IV, 175, 179.)

[12]Major Hough further described Animas City in a letter home on October 26th. "There are not more than 20 houses in this city but it has true Yankee enterprise—churches, a school & newspaper." (Alfred Hough to Mary Hough, from Animas City, Colorado, October 26, 1879, Hough Papers.)

[13]This type of tent was invented by General Henry Hopkins Sibley (1816-1886) and is based on the principle of the Sioux Lodge. It is conical in shape, supported by a central pole, resting on an iron tripod. It is well ventilated at the top, and will house from twelve to fifteen men.

forded us.[14] They had been in the habit of coming into the town and "running it"—in their language—which consists of doing just as they please, riding into stores and through houses, etc., and firing pistols. One day in December one of them was shot and killed by the City Marshal, and his companions sought to avenge him. They took possession of the town and the Marshal and Mayor fled to Col. Buell for protection. They threatened to come and take them, but he sent the Marshal over to my Camp, and after the whiskey was out of the boys they left town peaceably, previously burying their late comrade, from whose funeral they returned in full gallop shouting and firing pistols. We were however in an anxious state of mind all the time. We heard all kinds of rumors as to our prospects; at times we were ready to march at a moment's notice right into the mountains through the snows, and again we were to return to Fort Lewis; so that we were kept unsettled and excited. We were also anxious about Genl. Hatch, who had endeared himself to us by his soldierly bearing and uniform kindness to us. He was amidst the Indians as President of the Commission with but a small guard, and it appeared at times from what we heard, he would never come away from there alive, a catastrophe seemed imminent at all times.

On the 1st day of January 1880 I received orders for my battalion to proceed to Texas via Fort Gibson. This was good news. The orders directed that we proceed to Fort Garland if practicable; if not, to Santa Fe, where orders would be found for further movements. I decided at once to move south to avoid the snows, and Col. Buell issued orders accordingly for transportation.

On the morning of the 4th we started for the San Juan valley, and our part of the threatened Ute war was ended. The whole proceedings had been disgusting, and was another instance of the want of a plan in our dealings with the Indians. Here was a case of a tribe of Indians violating their treaty and committing several unprovoked murders, also of attacking troops while peacefully marching. Yet up to the time while I am writing[15] seven months afterwards, no Indian has been punished for these acts, and Congress is now talking about what is best to be done. In the mean time lawless miners are preparing to occupy the country and no doubt will do it. It will be the old, old story over again: while the government is talking, with a pretense of wanting to civilize the mass of the

[14]Regarding the cattle ranches, Major Hough has the following to say: "There are but few inhabitants in the country for there is very little room for them. But every little valley with a stream in it has its ranchers who sell their products to the miners in the Mountains west of here at a high price." (Alfred Hough to Mary Hough from Animas City, Colorado, October 22, 1879, Hough Papers.)

[15]May 8, 1880.

Indians, at the same time punishing none of the guilty ones, the frontiersmen will seize their homes and thus give cause for further outrages which will be an excuse for harsher treatment.[16] I was glad to get away from the muddle and not be a further participant in it.

[16]While Major Hough was disgusted with the "make-shift" policy of the government, as he called it, regarding the Indians, he had the professional soldier's dislike for the civilian population which served as an irritant in the Indian situation. Writing from Animas City he tells that the local paper has related how the female survivors of the Meeker massacre had been outraged. "I don't believe it, for it is in contradiction of all we have heard before and is gotten up by these people to inflame the public and be one step toward what they are trying to accomplish, which is to have an expensive war and bring in money and eventually to drive out the Utes. These frontier people are wholly unscrupulous. It is an outrage that we of the Army who have all the hardships to encounter should be made such catspaws of, mere tools of ambitious men who care only for their own interests, and cater to the public for popularity." (Alfred Hough to Mary Hough, from Animas City, Colorado, November 1, 1879, in Hough Papers.)

The Legal Status of the Colorado Cattleman, 1867-1887

CLIFFORD P. WESTERMEIER*

The cattleman's frontier in the middle of the 1880s embraced an area of about 1,365,000 square miles and totaled almost 44 per cent of the United States proper. Comparatively speaking, it equalled the combined area of Great Britain, Austria, Hungary, Italy, Spain, and Portugal, and one-fifth of Russia in Europe.[1] This area, in which were located the western and northwestern ranges and the ranch cattle districts of the United States, comprised the main part of the Indian country—the western portions of the Dakotas, Nebraska, and Kansas, the territories of Montana, Idaho, Wyoming, Utah, Arizona, and New Mexico. It also included the states of Nevada and Colorado, and portions of Oregon, California, and Washington.[2] A great part of this vast tract of land was used chiefly for cattle raising and was known as "the Plains." This area, extending from Texas to the Canadian border, was almost one thousand miles long, averaged two hundred miles in width, and

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[1]United States Congress, 48th Congress, 2nd session, *House Executive Documents*, Nimmo, Joseph, "Range and Ranch Cattle Traffic," v. XXIX, no. 267 (cited hereafter as US Cong. 48:2, *H. ex. doc.* (ser. no. 2304), 9.

[2]*Ibid.*, 12.

enclosed an area of nearly 130,000,000 acres.[3] This was the region of the "range" as distinguished from the "ranch" cattle business. The range cattle business was the raising and fattening of cattle on the public domain or the grazing of cattle on unfenced lands. The ranch cattle business was conducted on lands which were usually fenced and belonged to the cattlemen.[4]

The cattle business on the plains began at the time when the early stockmen supplied cattle to the emigrants who moved along the Oregon Trail, and to the army posts, which had already been established in the West. The cattlemen also discovered that animals turned loose on the plains survived the winter and were often sleek and fat in the spring.[5] Out of this discovery came the growth of ranches along the streams at the eastern base of the mountains. In 1859 John C. Dawson moved cattle in a drive, north from Texas into Colorado, and, so far as is known, this is the first record of a cattle drive into this area.[6]

Stock raising began near Canon City in 1862 or 1863; about 1872, one of the first large herds was driven from Texas into the Wet Mountain area. By 1876 about 1,500 Mexican cattle had been moved into the Platte Valley region.[7] The sudden growth of the industry is evidenced in the following statement:

> From this source of supply [Texas] has been drawn the great bulk of range cattle now to be found on the public lands east of the Rocky Mountains—an industry which has grown to huge proportions, and yet dating back in these States and Territories, a few years only. As an evidence of this we note that in 1870 the number given for Montana, Wyoming, and Colorado was a little less than 280,000. Ten years later Wyoming alone equalled this, while the three together aggregated nearly 800,000.[8]

"Stock raising in Colorado . . . attained an importance second only to mining, the estimated total value, of its cattle, sheep, and other animals in 1884 being $25,090,000."[9]

Several factors caused Colorado to be in the path of this Longhorn invasion. First among these was the demand for beef by the invading "fifty-niners". Others were the exorbitant prices of beef in the North at the end of the Civil War, the ideal climatic conditions in Colorado conducive to the range cattle industry, the proximity of Colorado to Texas, and the importance of its position in relation to the northern cattle trails which were constantly shifting westward. Colorado could not avoid this advance and was eventually engulfed. This momentous movement was bound to bring about a conflict between ideas of the various areas and interested personalities—local, national, and international—which were involved.

Therefore, the purpose of this study is threefold. First, to show the position which the cattleman occupied, as his work grew in scale and developed various problems; second, to investigate the legislation that resulted to protect his rights and the rights of those apparently hindering his progress; third, to summarize the basic principles and laws governing the cattle industry of the United States.

The range cattle industry suffered an unfortunate and serious setback because the cattle, moving up from Texas, spread the destructive cattle disease known as "Texas" fever—sometimes designated as "splenetic" fever, or as "Spanish" fever. Cattle that were born and raised in southern Texas and along the Gulf area never appeared to be affected by Texas fever; however, if they were moved to northern Texas, or to the states and territories of the Northwest and Northeast, they carried with them the disease which became fatal to the cattle of these northern regions.[10] The appearance of this disease, which was already known in Europe in the seventeenth century, during the cattle drives of 1850 in Arkansas, Missouri, and Kansas, was not the first in this country. The first account of the dissemination of this disease by apparently healthy cattle from certain districts of the southern States appears in 1814.

[3] *Ibid.*, 12.
[4] *Ibid.*, 9.
[5] Bancroft, H. H., *History of Nevada, Colorado and Wyoming, 1540-1880*, Works, v. 25, (cited hereafter as Bancroft, *Hist of Nevada, etc.*,), 543-544. *See* Love, Clara M., "History of the Cattle Industry in the Southwest," (cited hereafter as Love, "Hist. of Cattle Industry, etc.,") *Southwestern Historical Quarterly* (*SHQ*) 19 (April, 1916), 387.
The history of this important discovery is stated as follows by Theodore J. McMinn of Saint Louis:
"Early in December, 1864, a Government trader, with a wagon train of supplies drawn by oxen, was on his way west to Camp Douglas, in the Territory of Utah; but on being overtaken on the Laramie plains by an unusually severe snow storm, he was compelled at once to go into winter quarters. He turned his cattle adrift, expecting, as a matter of course, they would soon perish from exposure and starvation. But they remained about the camp, and, as the snow was blown off the highlands, the dried grass afforded them an abundance of forage. When spring opened they were found to be in even better condition than when turned out to die four months previously." US Cong. 48: 2, *H. ex. doc.* (ser. no. 2304), 12. *Daily Patriot* (Springfield, Missouri), November 19, 1866.
[6] *10th Census Report of the United States, 1880, v.* iii, Gordon, C., "Report on cattle, sheep, and swine," 940.
[7] Bancroft, *Hist. of Nevada, etc.*, 544.
[8] Keese, J. P., "Beef from the Range to Shambles," *Harper's Magazine*, 69: (July, 1884), 293.
[9] Bancroft, *Hist. of Nevada, etc.*, 543.
[10] US Cong. 48: 2, *H. ex. doc.* (ser. no. 2304), 29.

> Attention was at that time called to this phenomenon by Dr. James Mease in a lecture before the Philadelphia Society for Promoting Agriculture, who stated that cattle from a certain district in South Carolina so certainly diseased all others with which they mixed in their progress to the North that they were prohibited by the people of Virginia from passing through the State; . . . Legislation was enacted in the North Carolina, however, as early as 1837 to prevent the driving of cattle into that State from either South Carolina or Georgia between the first day of April and the first day of November; . . .[11]

This mysterious disease, which was very fatal to northern cattle, seemed to appear only along the great trails and roads over which the cattle from the South were driven. It killed almost 50 per cent of all the native stock with which it came in contact, and farmers located on the fording streams lost as high as 90 per cent of their cattle. Still, no suspicion was cast upon the imported Texas cattle. Between the years 1856 and 1860, a great many Texas cattle were driven into Kansas, Missouri, Iowa, Illinois, and Kentucky. About the year 1861, there was a strong conviction that the high mortality of northern cattle in these areas was caused by the dissemniation of a disease by those imported from Texas. The states of Kansas, Missouri, Kentucky, and Illinois enacted laws to combat it by regulating the cattle drives from the South.

During the Civil War the disease disappeared in these states, and its ravages were apparently forgotten. However, it reappeared in 1866, 1867, and 1868 with the new droves of cattle from Texas. In 1868, when great herds of Texas Longhorns were driven into Illinois, Indiana, Ohio, Pennsylvania, New York, and other northern states, it became a serious reality.[12]

Kansas was the first western state that took legislative action against the fever. In 1859, two years before statehood, an act was passed that prohibited the driving of cattle from Texas and Arkansas into any one of the four eastern counties of the territory. This prevented contact with the native cattle and was in force from June to November.[13] When the farmers came into the western area of the state, the Legislature extended the law, (1867) so that it

[11]*Yearbook of the United States Department of Agriculture, 1899*, "Texas Fever, Splenetic Fever, or Southern Cattle Fever," 124-125. *Missouri Democrat* (St. Louis, Missouri), September 18, 1868.

[12]*Yearbook of the United States Department of Agriculture, 1899*, "Texas Fever, Splenetic Fever, or Southern Cattle Fever," 125-126.

[13]*Laws of Kansas Territory*, 1859, Sess. 5, 622. *Laws of Missouri*, 24th General Assembly, 1st Sess., 1867, 128. *Missouri Democrat* (St. Louis, Missouri), August 21, 1868; August 24, 1868; September 10, 1868; September 12, 1868; September 17, 1868; September 21, 1868; September 29, 1868; October 10, 1868.

reduced the size of the territory in which the cattle might remain in quarantine until late fall before they were moved out. Thus the trails from Texas constantly moved westward to escape the restrictions.

Laws of a similar nature were passed against Texas cattle by Missouri, Nebraska, Colorado, and Dakota:

> These early laws assumed that all Texas cattle were infected, and therefore must be subjected to restrictions and regulation. Since there was no discrimination, the state was practically regulating commerce in cattle between itself and Texas. Such an exercise of power was clearly in violation of the Federal Constitution.[14]

During the entire period of the open range, this disease and its fatal result marked, in a very pronounced way, the growth and development of the business. The state and territorial quarantine laws were real barriers to the cattle-moves from Texas, both to the Northern Plains and to the domestic and foreign markets.

In this same period the cattle business faced the curtailment of its foreign market. In 1879 the British minister in Washington lodged a complaint about alleged diseases among American cattle being shipped to England.[15] The possibility of restriction on the importation of American cattle caused the Secretary of the Treasury to issue a circular authorizing inspection of American cattle for export. The inspection was to be done by port collectors and health certificates had to be issued. However, this inspection did not apply to shippers. Naturally, as far as inspection was concerned, such a stand was farcical.[16]

A second circular appeared on February 1, 1879, whereby all cattle were to be inspected and none was passed without a statement of clearance. These terms were found inadequate, for within a fortnight an Order in Council appeared from the English government which stated that all American cattle were to be slaughtered within ten days after their arrival. Although the American government appealed for a modification of this law and agreed to improve the port inspection, the English government refused because it felt that the inspection was inadequate.[17]

[14]Osgood, Ernest S., *The Day of the Cattleman*, Minneapolis, 1929 (cited hereafter as Osgood, *Cattleman*), 163.

[15]Great Britain, *Parliamentary Papers*, 1878-1879, v. 58, "Correspondence connected with the detection of pleuro-pneumonia among cattle landed in Great Britain from the United States of America," Salisbury to Thornton, January 30, 1879, 1.

[16]*Synopsis of Decisions*, Treasury Department, 1879, circular no. 3823, 750.

[17]*Synopsis of Decisions*, Treasury Department, 1879, circular no. 3867, 32. Great Britain, *Parliamentary Papers*, v. 58, 6-7. *Report of the Secretary of the Treasury*, 1880, xxxiii.

This move on the part of the British government caused the federal government to take action because one of the most profitable trades in the United States was threatened. Therefore Congress appropriated on March 3, 1881, $15,000 and authorized the Secretary of the Treasury "to procure information concerning and to make inspection of neat cattle shipped from any port in the United States to any foreign ports, so as to enable him to cause to be issued to the shippers of such cattle certificates showing in proper cases that such cattle are free from the disease known as pleuro-pneumonia."[18]

An additional sum of $50,000 was appropriated by the following Congress in each of its two sessions "to enable the Secretary of the Treasury to cooperate with state and municipal authorities, and corporations engaged in cattle transportation by land and water, in establishing regulations to prevent the spread of pleuro-pneumonia and to establish quarantine stations."[19]

At this time the Treasury Cattle Commission was formed and it published a report in 1882.[20] Basically, the report concerned the inspection of cattle disease and urged federal inspection instead of state inspection which, the British government felt, was not adequate.[21]

The quarantine regulations and a westward moving farmer with his fences caused the cattle trails coming from Texas to move farther west. The trails now left from the Texas Panhandle, and the eastern edge of Colorado became the passage to the northern feeding ranges. Also, the cattlemen of western Kansas realized that their range was disappearing because of overstocking. They opposed the growing number of Texas cattle in their territory. The Southwestern cattlemen were aware of the growing dislike for their herds, and also realized that, if the northern trails were closed to their stock, they would be out of business.[22]

At this time the stock growers of the country made known their desire for federal protection. The Commissioner of Agriculture issued a circular letter to the cattlemen requesting them to meet during the Fat Stock Show in Chicago in November, 1883.

Representatives from twenty states and territories, one hundred and seventy-five in number, attended this meeting. The Wyoming delegates, because the Association had been very active in preventing cattle disease in the High Plains region, dominated the convention. They felt that the problem of cattle disease could be solved only by federal intervention. At this meeting a committee of eight was named to represent the combined interests in obtaining legislation which would be effective. These men were to go to Washington in January 1884, to meet with the Treasury Cattle Commission and the Commissioner of Agriculture. They were advised to "suggest to Congress such points of legislation as they may deem best calculated to protect our interests and remove foreign prejudice against our meat production."[23]

In 1884 the Southwestern cattlemen agitated the calling of a convention of all the stockmen in the country.[24] A date had been set to hold a national meeting in Chicago in November of 1884, and the Southwesterners planned to hold their meeting at St. Louis during the same month. The Chicago Convention agreed to join the meeting in St. Louis.

The delegates at this convention in St. Louis resolved that Congress should open, establish, and maintain a national stock trail beginning at some point on the Red River and extending to the northern boundary of Wyoming. J. C. McCoy, author of *Historic Sketches of the Cattle Trade of the West and Southwest*, made an ardent appeal for a trail six miles wide. The subject of contagious diseases was discussed at great length, and the majority of the delegates were in favor of leasing the public domain. Great opposition arose on the part of the delegates from Wyoming and Montana, who were supported by the majority of the delegates representing the Chicago Convention.[25]

However, the plans to establish a National Cattle Trail were delayed when the state of Kansas, in the month of February, 1885, took action to declare such a plan to be inimical. The promoters and advocates of the trail then decided that it would be better to locate along the western border of Colorado and in that state. The Honorable James F. Miller of Texas proposed a bill to this effect in Congress:[26]

[18]United States *Statutes at Large*, v. xxi, 442.
[19]United States *Statutes at Large*, v. xxii, 313, 613.
[20]United States Congress, 47th Congress, 1st session, (1882) *Senate Executive Documents*, "Report of the Treasury Cattle Commission on the lung plague of cattle or contagious pleuro-pneumonia," no. 106 (cited hereafter as US Cong. 47: 1, *S. ex. doc.* (ser. no. 1990), 1.
[21]*Ibid.*, 1.
[22]*Laws of Kansas*, Special Session, 1884, 5-13. *Breeder's Gazette*, (April 17, 1884), v. 5, 584.
[23]*National Live Stock Journal* (October, 1883), v. 14, 448., (December, 1883), 533-534. Clay, John, *My Life on the Range*, Chicago, 1924, 120-121.
[24]The West in general, and the Southwest in particular, were antagonized by this attempt to obtain Federal quarantine over Texas cattle; however, the obvious benefits of cooperation were not lost upon the men of the Southwest. *Missouri Republican* (January 18, 1884), 5.
[25]*Missouri Republican* (November 21, 1884), 8-9., (November 22, 1884), 10. (McCoy's book was on sale at the Convention and there were only 125 of the last edition left.) *Missouri Republican*, (November 22, 1884), 10. US Cong. 48: 2, *H. ex. doc.* (ser. no. 2304), 31.
[26]US Cong. 48: 2, *H. ex. doc.* (ser. no. 2304), 31.

> Since the introduction of the bill in Congress, in February, 1885, for the establishment of a national cattle trail, apparently insuperable obstacles to the consummation of that project have been presented in the quarantine laws recently passed by the States of Kansas and Colorado. Those enactments appear to constitute an absolute embargo against driving or transporting by rail Texas cattle into or across those States.[27]

As early as 1867, Colorado passed a quarantine law against the movement of Texas cattle into her lands. The act stated:

> There has heretofore existed and still exists among animals known as "Texas cattle," a contagious disease known as "Texas fever," making their importation into this territory dangerous to cattle growers and dealers in stock; therefore, Be it enacted by the Council and House of Representatives of Colorado Territory:
> Section I. That it shall not be lawful for any person or persons to import into the territory of Colorado, any bull, cow, oxen, steer, or cattle of whatever description known as "Texas cattle," for the purpose of sale, stock raising, growing, herding, or feeding, or for any purpose whatever.[28]

The act further forbade the possession of Texas cattle after May 1, 1867. Fines were to be imposed, in sums of money not less than fifty dollars nor more than two hundred dollars for a first offense; and upon conviction, for a second offense not less than one hundred dollars nor more than three hundred dollars. The offender could also be forced to pay one hundred dollars for every twenty-four hours delay in holding the herd within the limits of the Territory.[29]

Fear of spread of the disease made the stockmen uneasy, and two years later a law was passed which provided that all diseased animals must be isolated six miles from any herd or farm. However, this law was not sufficient to calm the worries of the stockmen, and in 1879 another law was enacted stating that cattle that had been in Texas or the Indian Territory, preceding entry from the first of May to the first of September, could not be admitted into the state. Violation of this act was subject to a fine from one thousand dollars to three thousand dollars.[30]

[27] *Ibid.*, 35.
[28] *Colorado Territory, General Laws, Private Acts, Joint Resolutions, and Memorials, Passed at the Sixth Session of the Legislative Assembly of the Territory of Colorado, 1867*, Central City, 1867, (cited hereafter as *Colorado General Laws, etc.*, 6 sess.,), 86.
[29] *Ibid.*, 86.
[30] *Colorado Territory, General Laws, Private Acts, Joint Resolutions, and Memorials, Passed at the Ninth Legislative Assembly of the Territory of Colorado, 1872*, Central City, 1872 (cited hereafter as *Colorado General Laws, etc.*, 9 sess.,), 182. *Colorado Session Laws, 1879*, 191.

By 1884 Texas fever had become so common that the Colorado cattleman demanded protection for his stock. A strict quarantine law was passed March 21, 1885, whereby it was illegal to bring into the state cattle that had been in contact with diseased stock within ninety days prior to arrival in the state. All stock south of the parallel of thirty-six degrees from the first of April until the first of November were required to be north of that line for a period of ninety days before importation. A bill of health from the state veterinary sanitary board of Colorado stating that the cattle were free from disease and had not been exposed for the past ninety days would give them free passage. Anyone violating this act was subject to a fine of five hundred to five thousand dollars or a jail sentence of six months to three years, or both, depending upon the opinion of the court.

To carry out the act a state veterinary sanitary board was created. This was to serve for two years and consisted of three members—a state veterinary surgeon, and two members appointed by the governor with the approval of the Senate.[31]

Opposition arose on two sides against the state quarantine laws and the action taken at the First National Convention of Stock Growers in 1883. The Southwestern cattlemen, fearing that a federal quarantine might prevent the shipping and driving of Texas cattle to market, united solidly against the legislation that was proposed. They were supported by the packers and commission men of the Chicago Stockyards who realized that an embargo on Southern cattle would efface the competition which was advantageous to them. Therefore they sent a petition to Congress in the winter of 1883-1884, protesting this legislation.[32]

Bills had been introduced in Congress since 1879, asking that some kind of federal agency be established to aid in checking the spread of cattle disease. During the first session of the Forty-seventh Congress a bill, proposing the establishment of a Bureau of Animal Industry, was passed by the House but failed in the Senate.[33] It appeared again in the next session, and with many changes, it was passed and approved by the President on May 29, 1884.[34]

The bill, as finally passed, created a Bureau of Animal Industry in the Department of Agriculture. It was to be headed by a veterinary with an office group not to exceed twenty in number.

[31] *Colorado Session Laws*, 1885, 335-336.
[32] *Missouri Republican* (September 8, 1867); (January 18, 1884), 5. Osgood, *Cattleman*, 170-171.
[33] *Congressional Record*, 47th Congress, 1st session, (1882-1883), 381, 5113, 5116, 6827, 6830.
[34] United States *Statutes at Large*, v. xxiii, 31.

This new bureau had power to make rules and regulations to suppress cattle disease and it also encouraged the territories and states to cooperate and to carry out these rules.[35]

The public was very much disturbed because of the alarm created by pleuro-pneumonia and Texas fever. This question loomed in the mind of the public: What kind of meat were the packing houses distributing? Diseased cattle meant diseased meat. Since England had prohibited meat from America because of a lack of inspection, the public was more insistent in demanding that the federal government require inspection of meat products just as it had done for cattle. Consequently this work was relegated to the Bureau of Animal Industry in 1890.[36]

Although the federal government eventually agreed to come to the aid of the stock growers by means of legislative procedure, the constitutionality of the state quarantine laws was not settled until 1877. In the case of Railroad Company *v.* Husen, the highest court of the land decided that:

> The Statute of Missouri which prohibits driving or conveying any Texas, Mexican, or Indian cattle into the State, between the first day of March and the first day of November in each year, is in conflict with the clause of the Constitution that ordains "Congress shall have the power to regulate commerce with foreign nations, and among the several States, and with the Indian Tribes."[37]

(To be Continued)

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[35]*Congressional Record*, 48th Congress, 1st session, (1883-1884). 889.
[36]Osgood, *Cattleman*, 174.
[37]Railroad Company *v.* Husen, *95 United States* (October, 1877), 465.

Transmountain Water Diversion in Colorado*

DONALD BARNARD COLE

SIGNIFICANT ASPECTS OF DIVERSION

Transmountain water diversion in Colorado is a many-sided subject, the aspects of which may be grouped under three headings: first, the significant features of the projects themselves; second, the usefulness of transmountain water diversion on a state and local level; and third, their interstate, national and international significance.

From an engineering, financial, and legal point of view transmountain water diversion projects in Colorado are in themselves

*Continued from the March, 1948, isue.—Ed.

of great significance. The most striking engineering feature is the enormous length of some of the tunnels. In 1909 the Gunnison tunnel was the longest irrigation tunnel in the world,[1] while thirty years later the tunnel proposed for the Colorado-Big Thompson project was to be the longest in the world.[2] It was further stated that this would be the longest tunnel for any purpose in the world constructed from both ends only.[3]

The dams of the projects have also been large. The GreenMountain dam of the Colorado-Big Thompson project is 270 feet high, and in 1938 was the highest earthfill dam ever constructed by the Bureau of Reclamation.[4]

The difficulties encountered in both the Gunnison tunnel and the Moffat tunnel were unusually great. In the former the combination of flooding, gas, and rockslides caused long delays.[5] The Moffat tunnel had a hump in the middle and in order to force water over it, the water had to be elevated before it entered the tunnel.[6]

Owing to the size of the projects, the technical methods used in constructing them, and the obstacles encountered, the *Engineering News-Record* has been constantly interested in Colorado transmountain water diversion. This interest, stemming as it does from an enginering viewpoint, serves to indicate the significance of that phase of the projects.

The financial aspects of transmountain diversion in Colorado have also been of great significance. One of the early projects was a potent factor in the evolution of the government's policy of financing reclamation projects. In the 1930s they served to exhibit the financial methods by which the New Deal encouraged other than government undertakings. The Colorado-Big Thompson project, finally, sheds light on the cooperative character of irrigation in the West.

With the establishment of the Reclamation Service in 1902 the government initiated its policy of constructing irrigation works. Before the Reclamation Service could undertake any project, however, the government insisted that arrangements be made for the repayment of the costs within ten years of completion.[7] Accordingly in 1904 the Uncompahgre Valley Water Users' Association was formed to repay the expenses of the Uncompahgre pro-

[1]Robert R. Ingram, ed., *Yearbook of the State of Colorado 1939-1940* (Denver, 1944), 442.
[2]*The Reclamation Era*, XXXI (1941), 62.
[3]*Ibid.*
[4]*Ibid.*, XXVIII (1938), 255.
[5]Alvin T. Steinel, *History of Agriculture in Colorado 1858-1926* (Fort Collins, Colorado, 1926), 536-537.
[6]*Engineering News-Record*, CXI (July-Dec. 1933), 119.
[7]Percy S. Fritz, *Colorado, The Centennial State* (New York, 1941), 331.

ject.[8] Owing to many difficulties, however, the settlers of the Uncompahgre Valley and those on other federal reclamation projects were unable at the end of ten years to pay back the money.[9] Consequently Congress extended the time of repayment from ten to twenty and then forty years.[10] Thus transmountain water diversion in Colorado had a part in shaping government finance policy.

During the 1930s loans from the New Deal greatly stimulated transmountain diversion in Colorado. While the Twin Lakes Reservoir and Canal Company used loans from the Reconstruction Finance Corporation, the city of Denver turned to the Public Works Administration for help.[11] The arrangement for the Moffat tunnel was the unique lease method, under which the city deeded the project to the PWA and then leased it back for thirty years. By the end of this time the lease money will have paid for the project, which will then revert to the city.[12]

Among the many cooperative organizations which irrigators in the West have formed are colonies, associations, mutual companies, and irrigation districts.[13] The Colorado-Big Thompson project reflects the significant aspects of the irrigation district which today is becoming more and more important in the West.

The North Colorado Water Conservancy District has made a contract with the government for the repayment of the irrigation charges of the Colorado-Big Thompson diversion.[14] They plan to raise most of the money through the sale of water to the irrigators, but one-fourth of it will accrue from a tax which the district will levy on all property under its jurisdiction.[15] Since an irrigation district includes everyone residing in a certain area and is not made up of irrigators only, many persons not using the water will thus help pay for it.[16] This is justifiable inasmuch as the non-irrigators will profit from the increased prosperity of the district. With its tacit admission of the interdependence of all persons in the area,

[8]William Melcher, *The Uncompahgre Reclamation Project* (Madison, Wisconsin, 1931), 20-21.

[9]*Ibid.*, 7, 25-34.

[10]*Ibid.*, 8, 25-34.

[11]"Driving a Water Tunnel under the Continental Divide," *Engineering News-Record*, CXIII (July-Dec. 1934), 752-753; *Ibid.*, CXIII, 730-731.

[12]*Ibid.*

[13]C. W. Beach and C. J. Preston, *Irrigation in Colorado*, U. S. Department of Agriculture, Office of Experiment Station's Bulletin 218 (1910), 23-31.

[14]*The Reclamation Era*, XXVIII (1938), 215.

[15]*Ibid.*

[16]Wells A. Hutchins, *Mutual Irrigation Companies*, U. S. Department of Agriculture Technical Bulletin 82 (1929), 5-6; Wells A. Hutchins, . . . *Irrigation Districts, Their Organization, Operation, and Financing*, U. S. Department of Agriculture Technical Bulletin 254 (1931), 2-3.

this method of financing is an extension of the cooperative spirit of irrigation in the West.

The final source of interest stemming from the projects themselves is their legality. Opponents of transmountain water diversion have questioned its legality several times in the past, and even as late as 1937 Congressman Lawrence Lewis of Colorado felt impelled to defend it in Congress. His defense was an excellent one in which he showed that all three branches of the federal government had recognized the legality of such diversions. While the Supreme Court did it explicitly in the case of Colorado *v.* Wyoming, the executive branch gave implicit adherence by constructing the Gunnison tunnel and by lending money for the projects in the 1930s. Congress recognized their legality by authorizing the Uncompahgre Valley and Boulder Dam projects.[17]

The principal argument against transbasin diversions was that the water left the original basins forever and hence hurt the interests of persons in that area. In 1914 Wyoming presented this argument to prove that the Laramie-Poudre tunnel, which diverted water from the North Platte to the South Platte, was illegal. Although Wyoming won the case on other grounds, the Supreme Court decision of 1922 declared transmountain diversion to be legal.[18]

Today the practice of transmountain water diversion is widespread and its legality is accepted. The history of these diversions in Colorado, as Lewis pointed out, provides a convenient framework for establishing this legality.

Turning now from the engineering, financial, and legal aspects of the projects themselves, it is necessary to discuss their usefulness on a local and state level. This utility may be considered under the headings of agriculture, power, municipal water supply, and the tourist trade.

In almost all the Colorado transmountain water diversions irrigation agriculture has been the principal motivating force. A discussion of the agrarian aspect of these diversions must include answers to the following questions. First, are they necessary? Second, how important a part do they play in the irrigation of the state? Last, do they sacrifice the interests of one part of the state at the expense of another?

[17]*Hearings before the Committee on Irrigation and Reclamation, House of Representatives, on Senate Bill 2681, the Colorado-Big Thompson Project, Congressional Hearings*, 75 Cong., 1 sess., number 161, 28-33. (Afterward referred to as *Hearings . . . on Senate Bill 2681*).

[18]State Engineer of Colorado, *Seventeenth Biennial Report, 1913-1914* (Denver, 1915), 35; State Engineer of Colorado, *Twenty-First Biennial Report, 1921-1922* (Denver, 1923), 25.

A glance at the amount of water used per acre for irrigation in both the United States and parts of Colorado will help indicate the shortage of water in the valleys of eastern Colorado. Throughout the United States in 1939 irrigators used an average of 2.7 acre-feet of water on each acre irrigated.[19] In the valley of the South Platte in Colorado, however, the average was only 1.8 acre-feet, and the Colorado portion of the Arkansas and Rio Grande basins used 2.0 and 1.5 respectively.[20] This seems to indicate that the eastern valleys could use more water.

At this point the question could be raised as to whether the eastern Colorado irrigators were using as much water as possible from the streams at their disposal. In 1939, a wet year, about two million acre-feet were used for irrigation along the South Platte, and only 438,000 acre-feet allowed to flow into Nebraska.[21] A year later, a dry year, only 61,790 acre-feet got by the careful irrigators along the South Platte.[22] Along the Arkansas and Rio Grande there are very similar statistics.[23] Since it is impossible to get every last drop out of a river, and since some water must go to adjacent states anyway, these figures demonstrate that the east-side sponge had been squeezed practically dry.

While the above figures indicate that the eastern valleys as a whole were short of water, the Bureau of Reclamation in defense of the Colorado-Big Thompson project presented statistics to show that the South Platte Valley below Denver specifically needed more water than the river could provide. The Colorado-Big Thompson project will bring water to this area.

They first set out to prove that the flow of the South Platte had diminished since 1926, when supposedly there had been enough water. They showed that between 1927 and 1936 the average annual amount of water used for irrigation was some 500,000 acre-feet less than in 1926.[24] This alone does not prove that the river flow was lower because the 500,000 acre-feet might have been flowing into Nebraska. During that period, however, the annual flow of the

[19] *Sixteenth Census of the United States, 1940, Irrigation of Agricultural Lands*, 12.

[20] *Ibid.*, 195, 197, 199.

[21] *Ibid.*, 195; State Engineer of Colorado, *Thirtieth Biennial Report 1939-1940* (Denver, 1941), 76.

[22] *Ibid.*

[23] Arkansas basin in Colorado: 900,000 acre-feet used in 1939, and 56,000 crossed into Kansas, *Ibid.*, 140; *Census of 1940, Irrigation of Agricultural Lands*, 197. Rio Grande basin: 800,000 acre-feet used 1939, and 300,000 entered New Mexico, 1940, only 100,000 entered New Mexico, *Ibid.*, 199. State Engineer of Colorado, *Report of 1939-1940*, 179.

[24] *The Colorado-Big Thompson Project, Synopsis of Report by Bureau of Reclamation, Senate Document 80*, 75 Cong., 1 sess., 8. (Afterward referred to as *Colorado-Big Thompson Project.*)

South Platte at the state line averaged only 220,000 acre-feet.[25] River flow had diminished.

The second argument of the bureau was that this area had been changing to crops which needed more water, and that was also correct.[26] Between 1910 and 1930 sugar beet and vegetable acreage had risen from 11 per cent to 24 per cent of the total acreage irrigated below Denver.[27] Since these crops use much more water than corn and wheat there was an increased need for water.[28]

The answer to the first question then is in the affirmative. Transmountain water is a necessity for the river valleys of eastern Colorado and is particularly necessary in the South Platte basin below Denver. The great crop losses in 1934, in which almost 50 per cent of Colorado's crop acreage, most of which is on the east side, failed, demonstrates this need.[29]

The answer to the question of the importance of the diversions is a divided one. Since up to the present the total amount of water diverted annually into the eastern valleys for irrigation has been at best about 100,000 acre-feet contrasted with the four million acre-feet used annually for irrigation there, the effect has been particularly important.[30] To the people who actually got this water it very likely meant much, but on the whole the importance was not great. When the Colorado-Big Thompson project is finished, it will boost the transmountain total to about 400,000 acre-feet, and this will be decidedly important.

The populous South Platte Valley below Denver will receive the water of the Colorado-Big Thompson project and this water will make up for the shortages between 1927 and 1936, which amounted to 500,000 acre-feet a year. The Colorado-Big Thompson project will divert 300,000 acre-feet, and seepage from this amount

[25] State Engineer of Colorado, *Twenty-Fourth Biennial Report, 1927-1928* (Denver, 1929), 99; State Engineer of Colorado, *Twenty-Fifth Biennial Report, 1929-1930* (Denver, 1931), 97; State Engineer of Colorado, *Twenty-Sixth Biennial Report, 1931-1932* (Denver, 1933), 51; State Engineer of Colorado, *Twenty-Seventh Biennial Report, 1933-1934* (Denver, 1935), 66; State Engineer of Colorado, *Twenty-Eighth Biennial Report, 1935-1936* (Denver, 1939), 81.

[26] *Supplemental Hearing before the Subcommittee of the House Committee on Appropriations on the Interior Department Appropriations Bill for 1937, Congressional Hearings*, 74 Cong., 2 sess., number 24, 35. (Afterward referred to as *Supplemental Hearing.*)

[27] State Engineer of Colorado, *Fifteenth Biennial Report, 1909-1910* (Denver, 1911), insert facing 42; State Engineer of Colorado, *Report of 1929-1930*, 291.

[28] *Fifty-Eighth Annual Report of the Colorado Agricultural Experiment Station, 1944-1945* (Fort Collins, Colorado, 1945), 38.

[29] 3,852,348 acres harvested, 3,389,152 acres failed. *Sixteenth Census of the United States, 1940, Agriculture*, I, part 6, 234.

[30] State Engineer of Colorado, *Thirty-Second Biennial Report, 1943-1944* (Denver, 1946), 16-17.

will add nearly enough to make the total 500,000 acre-feet.[31] In short, it will safeguard the region during dry periods and make it more prosperous during wet ones.

Before the agricultural usefulness of the diversion can be determined it must be shown that the west side will not suffer. While irrigation along the South Platte averaged 1.8 acre-feet per acre in 1939, that on the Colorado was 4.7 acre-feet.[32] Furthermore the Colorado river irrigators used only 40 per cent of the water flowing in the river in 1939, while in the basin of the South Platte

EAST PORTAL ALVA B. ADAMS TUNNEL AS FIRST WATER TO BE DIVERTED EMERGES.

over 80 per cent was used.[33] In the same year four and a quarter million acre-feet of water flowed out of the state in the Colorado, and even in dry 1934, when the Colorado was 50 per cent below normal, 2,216,450 acre-feet passed into Utah.[34] This seems to indicate that even though irrigators along the Colorado were using an abnormal amount of water per acre, there was still a lot left over. A certain amount of transmountain diversion to the east side will not hurt the west side. What the west side needs to prevent crop failure in the future is better control of the rampaging Colorado. The reservoir already built as part of the Colorado-Big Thompson project is a step toward this improved control of the Colorado, and it is significant to note that the west side is in favor of the Colorado-Big Thompson project primarily because of the reservoir.[35]

[31] *The Colorado-Big Thompson Project*, 7-8.
[32] *Sixteenth Census of the United States, 1940, Irrigation of Agricultural Lands*, 195, 201, 204-205.
[33] *Ibid.*; State Engineer of Colorado, *Report of 1939-1940*, 76, 240.
[34] *Ibid.*, 240; State Engineer of Colorado, *Report of 1933-1934*, 166.

The proposed 800,000 acre-feet diversion from the Gunnison to the Arkansas is another matter. This is so large that it might hurt the interests of irrigators in the Uncompahgre Valley and along the lower Gunnison. The Gunnison Valley is very much opposed to the plan, but they might agree to a smaller diversion if at the same time a project were started on the Gunnison.[36]

The three questions have been answered. Colorado transmountain water diversion from the standpoint of irrigation agriculture is necessary and important, and if not carried too far will not hurt the interests of the west side. Part of the state will benefit very much from it, and the rest will not suffer.

Prior to the Colorado-Big Thompson project irrigation and municipal water supply were the only motivations behind transmountain water diversion in Colorado, but in that project the development of power is added. One has only to see the roaring Colorado mountain streams to realize their power potentialities. In 1937 Colorado ranked eleventh in the nation with a power potential of 851,000 horsepower, but in developed power she was a poor thirty-third with but 110,000 horsepower.[37] In 1937 less than 700,000,000 kilowatt hours of electricity were produced for public use in Colorado, and she ranked thirty-eighth in the country.[38] The Colorado-Big Thompson project promises to alter this situation, for when fully developed it will yield 900,000,000 kilowatt hours or over 200,000,000 more than Colorado was using in 1937.[39]

The question naturally arises at this point as to whether Colorado can use a large amount of additional electricity. Several factors indicate that she can. First of all the price will be much lower than before, and this may serve to entice industry to Colorado.[40] In 1941, for example, the lowest price for industrial electricity in Wyoming, Colorado, and New Mexico was over five mills per kilowatt hour.[41] According to plan, the price of Colorado-Big Thompson electricity will be 3.47 and 1.8 mills a kilowatt hour depending upon the type of electricity supplied.[42]

[35] *Hearings . . . on Senate Bill 2681*, 73-74.
[36] *The Christian Science Monitor*, February 11, 1947, 11.
[37] Ingram, *op. cit.*, 22.
[38] *Ibid.*
[39] *The Reclamation Era*, XXXII (1942), 21.
[40] National Resources Planning Board, *Mountain States Region Industrial Development* (Washington, D. C., 1942), 55.
[41] *Ibid.*
[42] *Ibid.*, 5.

Second, many power users in Colorado who are currently using steam are anxious to switch to hydroelectric power if it is cheap enough, and power from the Big Thompson project will be cheap.[43]

A final factor is that several cities and industries are in a position to utilize new hydroelectric power. The cities are Denver, Fort Collins, Sterling, and a few others along the South Platte.[44] The industries are mining, milling, and smelting.[45]

Although there is every indication that the power can be used, the Bureau of Reclamation does not intend to develop the full power facilities of the project until there is absolute certainty that there will be a market for the power.[46] They do not wish to see Colorado flooded with power that can't be used. This is wise for in addition to the Big Thompson project there will be a larger power development from the Cherry Creek project now under construction near Denver.[47]

While the power from these two undertakings is enormous, there are already proposals for more. The fabulous Gunnison project if undertaken would provide up to 2,500,000,000 kilowatt hours.[48] The proponents of this plan and of the Blue River project, which would provide Denver with enough water for twice its present population, anticipate a tremendous boom in Colorado.[49] With one eye on Colorado's huge coal and oil reserves and the other on mushrooming Southern California, they hope to make Colorado a great industrial state.

These people fail to realize that markets and transportation stand in the way of any large-scale Rocky Mountain industrialization.[50] Both west and east coast markets are still a long distance away, and railroad transportation to the markets is controlled by people unfriendly to Colorado industrialization. Although federal legislation has eliminated a lot of freight rate discrimination, the rates out of the Rocky Mountain region are still so high that they make it extremely difficult for mountain industry products to compete on the large markets.[51]

The same group that keeps freight rates out of the Rockies so high is also unwilling to see the development of cheap power there. This is a basic factor behind the slash in the budget of the Interior

[43] *Hearings Before the Senate Committee on Appropriations, Congressional Hearings*, 75 Cong., 1 sess., number 25, 342.
[44] *Supplemental Hearing*, 44.
[45] National Resources Planning Board, *op. cit.*, 55.
[46] *Colorado-Big Thompson Project*, 18.
[47] *The Christian Science Monitor*, February 11, 1947, 11.
[48] *Ibid.*
[49] *Ibid.*
[50] National Resources Planning Board, *op. cit.* 55.
[51] *Ibid.*, 54-55.

Department now contemplated in Congress. Until the Rocky Mountain region throws off these shackles, and they are trying to do that now, industrialization in Colorado had better go slowly.

While the agricultural and power aspects of Colorado transmountain water diversion are very controversial subjects, the municipal water supply feature has been accepted as a success. Denver has followed the example of Boston, New York, and Los Angeles in turning to transmountain water diversion for part of its water supply. Life in Denver has always been shaped by water, or rather by the lack of it. The dramatic story of 1932-1933, when there was no snowfall, shows the extent to which the city is dependent on acts of nature. Because of the lack of water, special rules have been established at various times regarding the watering of lawns and other domestic chores.[52]

Thanks to the Moffat tunnel Denver now is sure of its water supply. If ever there was a justification for transmountain water diversion, it is the lawns and gardens of Denver. The writer visited Denver in the heat and dryness of late July and August, 1946, and found the city a virtual oasis.

The final way in which transmountain water diversion will be useful as far as Colorado is concerned is the stimulation it will give to the tourist trade. Prior to the Colorado-Big Thompson project the undertakings had little or no effect on this trade, but the location of this project on both sides of Rocky Mountain National Park and particularly at Grand Lake made its effect on the tourist trade a matter of discussion.

In addition to the many protests of lovers of nature which have been discussed in a previous section there was a much more practical objection from the Grand Lake Property Owners' League.[53] They feared that by marring the beauty of the lake the project would reduce property values there and cut the tourist trade. Since Grand Lake is virtually dependent upon this trade for its livelihood, they were quite naturally alarmed. When the writer visited Grand Lake in 1946 he found that the property owners had abandoned their fears. Grand Lake was having the biggest summer in its history, and people everywhere were looking forward to the construction of Shadow Mountain Lake, which would make a greater boom possible. Thus the Colorado-Big Thompson project through this lake and through the publicity it has given Grand Lake and Rocky Mountain National Park has actually stimulated tourist trade in Colorado. Since this tourist trade is an important part of the state's economy, this contribution is not insignificant.[54]

[52] *The Christian Science Monitor*, February 11, 1947, 11.
[53] *Supplemental Hearing*, 41.
[54] Ingram, *op. cit.*, 64-66.

During the hearings on the Big Thompson project an effort was made to show that transmountain diversion had ruined the beauty of Twin Lakes.[55] This was not true, however. These lakes were abandoned as summer resorts long before the Twin Lakes tunnel. They were given up because the lakes were used as reservoirs and the water level was constantly fluctuating. There is no parallel between this and the Colorado-Big Thompson project because in the latter Grand Lake will not act as a reservoir, and the level of the lake will not change.[56]

CAMPING SCENE AT THE NEW SHADOW MOUNTAIN LAKE.

The usefulness of Colorado transmountain water diversion on a state and local level is then very great. With the completion of the Colorado-Big Thompson project it will be a potent force in the agriculture of the state. Power from the Big Thompson project should mean much to Colorado, but the advisability of more extensive power development is dubious. As a source of municipal water supply the Moffat tunnel is of inestimable value to Denver. The projects have either helped or at least not harmed the tourist trade. Though of small importance at first, transmountain water diversion today has become a significant factor in life in Colorado.

[55]*Supplemental Hearing*, 33-34.
[56]*Ibid.*, 74.

While heretofore this chapter has dealt with Colorado transmountain diversions from the point of view of the projects themselves and their state significance, the remaining section will be devoted to their interstate, national, and international implications. The rivers of Colorado serve to involve her not only with adjoining states but also with those at some distance. As one of the seven states of the Colorado River Basin, Colorado is closely connected with Wyoming, Utah, New Mexico, Nevada, Arizona, California, and also Mexico. The North and South Platte relate Colorado to Wyoming and Nebraska, while the Arkansas brings her into conflict with Kansas. To the south the Rio Grande has a common interest for Colorado, New Mexico, Texas, and Mexico. Because of these liquid ties Colorado is today a participant in six river compacts and more are pending.[57] It is because of these rivers that the influence of Colorado transmountain water diversion has gone beyond state lines.

Although Colorado's first interstate conflict was with Kansas, it was not until the Colorado-Wyoming case, 1914-1922, that transmountain diversion became a factor. This case, which has already been mentioned, was an effort on the part of Wyoming to prevent Colorado from diverting water from the North Platte to the South Platte. Wyoming brought suit against the Laramie-Poudre Reservoir and Irrigation Company, which was bringing water from the Laramie, a tributary of the North Platte, to the Cache la Poudre, a tributary of the South Platte. They contended that because of this diversion ditches with a priority older than that of the Laramie-Poudre tunnel were often without water, and they went so far as to say that transmountain water diversion was illegal.[58]

In response Colorado asserted that one-half of the water of the Laramie came from Colorado and that since they wanted only one-fifth of the total amount, they were justified in taking it. They insisted in spite of Wyoming's prior appropriations, that the Laramie-Poudre tunnel should get all the water it wanted because greater benefits could be derived from using the water in the Cache la Poudre Valley than along the Laramie. In short they expressed the opinion that water priority rights did not extend across state lines.[59]

In rendering its decision in 1922 the Supreme Court declared first that transmountain water diversion was perfectly legal, as

[57]Compacts concluded on Colorado, South Platte, La Plata, Rio Grande, Republican, and Costilla Rivers. Compacts pending on Arkansas and Little Snake Rivers. State Engineer of Colorado, *Report of 1939-1940*, 21-29; State Engineer of Colorado, *Report of 1943-1944*, 23-27; State Engineer of Colorado, *Report of 1921-1922*, 16-24.
[58]State Engineer of Colorado, *Seventeenth Biennial Report, 1913-1914* (Denver, 1915), 35.
[59]*Ibid.*, 35-37.

Colorado had contended. The Court also stated, however, that water appropriation rights did extend across state lines, as Wyoming had asserted, and proceeded to limit the Laramie-Poudre tunnel to 15,500 acre-feet a year.[60] Although this decision is significant because of its legal pronouncements, it is interesting also because for the first time Colorado transmountain water diversion had gone beyond the borders of the state.

While this decision was restraining transmountain diversion in Colorado to a certain extent, the Colorado River Compact of 1922 was actually stimulating it. The terms of this compact divided the flow of the Colorado between the upper and lower basins giving each 7,500,000 acre-feet a year.[61] Colorado and the other upper basin states had wanted the compact in order to prevent the three lower basin states, California, Nevada, and Arizona, from getting water appropriation rights to all the water in the river not at that time appropriated.[62] Colorado soon realized, however, that if she didn't put her share of the water to beneficial use, the states of the lower basin would demand revision of the compact. To prevent this Colorado and Utah as well turned to transmountain water diversion as a means of putting this water to beneficial use.[63]

In Colorado the compact was thus a factor in bringing about both the projects of the 1930s and the Big Thompson project, while in Utah it paved the way for the Duchesne-Provo tunnel. Today it has become a rush for water; and if the proposed Gunnison-Arkansas, Central Utah, and San Juan-Rio Chama projects go through in the upper valley, there will be one and a half million acre-feet less remaining in the basin.[64]

In the Rio Grande Compact of 1936, the right of transmountain water diversion was recognized and this time it was Colorado which stood to lose. New Mexico would like to divert water from the San Juan to the Rio Chama in northern New Mexico, and Colorado has acquiesced provided the rights of her settlers in the San Juan Valley are protected.[65]

On another river transmountain water diversion may help end interstate friction instead of creating it. This is on the Arkansas River, where a fight has been going on between Kansas and Colorado ever since 1905. After two Supreme Court decisions had failed to solve the dispute, the Court suggested that the two states make a compact.[66] When this compact is finally agreed upon, Colorado will be required to deliver a certain amount of water in the Arkansas to Kansas every year.

[60] State Engineer of Colorado, *Report of 1921-1922*, 25.
[61] *Ibid.*, 16-21.
[62] State Engineer of Colorado, *Twentieth Biennial Report, 1919-1920* (Denver, 1921), 29.
[63] "Piercing the Continental Divide." *Business Week*, June 21, 1941, 21.
[64] Edward Churchill, "Shall We Spend $2,000,000,000 More on the Colorado?", *Saturday Evening Post*, February 22, 1947, 28-29, 45-46, 48.
[65] State Engineer of Colorado, *Twenty-Ninth Biennial Report, 1937-1938* (Denver, 1939), 34, 38.

In preparation for this eventuality Colorado has already built the Caddoa Reservoir on the Arkansas near the state line.[67] In addition the Gunnison-Arkansas project is proposed. This would bring 800,000 acre-feet a year to the Arkansas Valley and hold it high up in the mountains in reservoirs until it is needed.[68] Since it would provide a reliable source of water, the project would serve to stabilize the Arkansas Valley and simplify the delivery of water to Kansas.

From the relatively small Laramie-Poudre tunnel to the giant proposed Gunnison-Arkansas project transmountain water diversion in Colorado has been a factor in the relation of the state with her neighbors. It has today an influence on all the important river valleys of Colorado and on the states into which these rivers flow.

On a national level transmountain water diversion in Colorado is enmeshed in the problem of public versus private projects. The history of the diversions in Colorado shows a trend toward government participation capped by the Colorado-Big Thompson project. Although Colorado is eager for government help in building her projects, she is unwilling to have government control go too far.

Above all, Colorado is opposed to the establishment of any authority like the TVA on rivers in which she has an interest. It is feared that under such an arrangement irrigation would be subordinated to navigation and power. In the case of the Arkansas, for example, they fear that water from the Gunnison-Arkansas project instead of being stored up for irrigation would be sent down the river to keep navigation going.[69] In a similar manner they are afraid that reservoirs would be emptied to keep power plants running at a time when prudent irrigation policy would dictate saving the water.[70] The crux of the situation is that navigation and power demand a constant flow of water while irrigation needs an uneven flow. With this in mind Governor Ralph Carr of Colorado in 1941 led the successful fight against the proposed Arkansas Valley Authority.[71]

Private power companies were also interested in the struggle and this reveals another conflicting situation. Although Colorado

[66] State Engineer of Colorado, *Report of 1943-1944*, 30.
[67] State Engineer of Colorado, *Thirty-First Biennial Report 1941-1942* (Denver, 1943), 28.
[68] *The Christian Science Monitor*, February 11, 1947, 11.
[69] "Fight for Water," *Business Week*, February 1, 1941, 16-17.
[70] "Ickes Challenged," *Business Week*, December 1, 1945, 64.
[71] "Fight for Water," 17.

is against power if it interferes with irrigation, she needs cheap power very much. In this respect Colorado is opposed by the private power interests of the East who have no desire to see cheap power flooding the nation.

Thus the power aspect of Colorado transmountain water diversions clashes with the irrigation feature and as a result Colorado finds herself in the midst of a national power controversy. Since irrigation comes first in Colorado, the state will not back cheap power if it interferes with irrigation, but she would like to have both.

Another national issue in which transmountain diversion in Colorado plays a part is that of agricultural policy. An argument against the Colorado-Big Thompson project in 1936 and 1937, and one not satisfactorily answered, was that it was unwise to increase agricultural production when the Department of Agriculture was trying to reduce it.[72] The principal crop to be increased by the project will be sugar beets, the production of which the Department of Agriculture wished to keep down in 1936 and 1937. Today of course sugar is scarce and the prospect of increasing its production looks good. In the future, however, by the time the effect of the Colorado-Big Thompson project is felt there may again be an over-production of sugar in all parts of the world. Then the farmers of the South Platte will want more tariff protection, and the arguments of 1936 and 1937 will seem more real.

Colorado transmountain water diversion with its complex irrigation, power, and agriculture problems is a real national issue. From now on, whatever takes place along the Continental Divide will be of national importance.

From an international point of view the Continental Divide is also important because of its relationship to the treaty with Mexico of 1945. As indicated above, a fight for water is already under way among seven states for the water of the Colorado River. With this treaty, Mexico has also been injected into the conflict.

According to the treaty which was in effect by the fall of 1945, Mexico will give the United States about 350,000 acre-feet of water in the lower Rio Grande, while the United States guarantees Mexico 1,500,000 acre-feet from the Colorado.[73] The Colorado River Basin had long feared a treaty of this sort, and this apprehension was expressed about 1937 by the state engineer of Utah who said:

> There is grave danger that the United States Commission may recommend decreasing the amount of Rio Grande water allotted to Mexico and correspondingly increasing the amount of Colorado River water. It is vital to the Colorado River Basin states that no such move be made.[74]

[72] *Congressional Record*, LXXXI (1937), 7414.

[73] State Engineer of Colorado, *Report of 1943-1944*, 28-30.

According to Professor Glaeser of the University of Wisconsin, the water appropriation rights of the lower Colorado have been damaged by this treaty. The Colorado River Compact of 1922 granted the lower basin 7,500,000 acre-feet plus 1,000,000 acre-feet of surplus water. At present the three states have already appropriated this amount although actual use in some cases may not begin for another generation. Professor Glaeser quotes Bureau of Reclamation statistics which show that the average amount of water released from Boulder Dam will be 8,500,000 acre-feet, and that when losses are deducted there will be only 7,900,000 acre-feet available for the lower basin. When the 1,500,000 acre-feet awarded to Mexico is added to the 8,500,000 appropriated by the lower basin, there is a total demand of 10,000,000 acre-feet, and a resultant deficit of 2,100,000 acre-feet. Since the million and a half acre-feet must go to Mexico, the lower basin will therefore suffer.[75]

Professor Glaeser's, or rather the Bureau of Reclamation's, estimate of the water leaving Boulder Dam seems rather low when compared with the average leaving it during the first ten complete years after it was put into service, that is from 1936 through 1945. The average for that ten-year period is 10,400,000 acre-feet a year, which would just about cover all the demands. The average, however, covers up the fact that in half of the years the flow was less than 8,500,000; and the Bureau may have thrown out the fiures of several of the high years as abnormal.[76]

The significance of transmountain water diversion in this situation is obvious. When the Colorado-Big Thompson and Duchesne-Provo tunnels go into operation they will take almost 400,000 acre-feet from the amount available at Boulder Dam. If the proposed Gunnison-Arkansas, Blue River, Central Utah, and Rio Chama diversions ever become a reality, they will total about 2,000,000 acre-feet, and would thereby double Professor Glaeser's estimated deficit in the lower basin. Whether Professor Glaeser's estimate is correct or not, the combination of the Mexican treaty, the tremendous growth of Southern California and Arizona, and

[74] State Engineer of Utah, *Twenty-First Biennial Report, 1936-1938* (Salt Lake City, 1938), 186.

[75] Martin G. Glaeser, "The Mexican Water Treaty: Part One," *The Journal of Land and Public Utilities Economics*, XXII (1946), 8.

[76] *The Surface Water Supply of the United States, part 9, Colorado River Basin*, U. S. Department of Interior, Geological Survey Water-Supply Paper: 809 (1936), 23; 829 (1937), 18; 859 (1938), 23; 879 (1939), 21; 899 (1940), 22; 929 (1941), 22; 959 (1942), 22; 979 (1943), 22; 1009 (1944), 23; 1039 (1945), 23.

the proposed transmountain water diversions out of the upper basin in Utah, New Mexico, and Colorado spells trouble in no uncertain terms. The future is very indefinite, but in whatever happens transmountain water diversion in Colorado will have a vital role.

Thus on an interstate, national and international level the Colorado projects are of great significance. In addition to these broader implications, this chapter has also discussed the important features of the projects themselves and their state and local significance. When taken together all these topics serve to make up the significant aspects of transmountain water diversion in Colorado.

CONCLUSION

In summary, this paper has shown the way in which geography and irrigation lay behind the development of transmountain water diversion in Colorado. It has also sketched the pattern of the early transmountain diversions and described in some detail the Colorado-Big Thompson project. The significant aspects of the diversions seemed to group themselves under three general headings: the projects themselves; their local and state utility; and their interstate, national, and international ramifications.

The subject is in many of its aspects a very controversial one. In regard to the conflict between the east side and west side in Colorado the fact that the western slope farmers have agreed to the Colorado-Big Thompson project indicates that their interests are not in jeopardy. The 800,000 annual acre-foot diversion of the proposed Gunnison-Arkansas project is so great, however, that it might hurt the settlers of the Gunnison Valley, while helping those along the Arkansas. A compromise project about the size of the Colorado-Big Thompson affair would be a better solution. It would benefit the Arkansas basin while not hurting the Gunnison.

Although the power feature of the Colorado-Big Thompson project appears sound, the tremendous expansion contemplated in the Gunnison-Arkansas proposal is at best a risky venture. Colorado must free herself from transportation handicaps before any effective industrialization can take place.

The subject of power leads directly to the complexity of national issues involved in power. As far as Colorado is concerned the important fact is that irrigation comes before power and Colorado will sacrifice her power interests in order to protect irrigation. They feel quite justifiably that with transmountain water diversion agriculture will continue to be the primary source of income of the state, and that it must not be jeopardized.

The three-cornered fight along the Colorado between the upper basin, the lower basin, and Mexico will be a problem confronting all Americans from now on. Since the Mexican Treaty has superseded the Colorado River Compact, the lower basin may call for revision of the compact. Then the philosophical question as to whether water for Denver and irrigation in eastern Colorado should come before municipal water for Los Angeles and Imperial Valley irrigation will be raised. Regardless of which side wins, the other will want renunciation of the Mexican Treaty, and this would quite naturally involve the question of the good neighbor policy. The answers to these issues are obviously far beyond the scope of this paper, but they serve to indicate the broader implications of Colorado's transmountain projects.

Although it is difficult to justify the Colorado-Big Thompson project on the grounds of government agricultural policy in the light of its tariff aspect, and even though the ballooning of costs may render repayment at best difficult, the fact that this project will prevent serious crop losses and thus stabilize life along the South Platte is ample justification for it. Any projects which Colorado proposes for the future, however, must be carefully scrutinized in the light of their national and international effects. For this reason the proposed Gunnison-Arkansas project is too large. If reduced to the size of the Colorado-Big Thompson project, however, the benefits to eastern Colorado and Kansas might outweigh disadvantages elsewhere. Like many problems of its type this one does not have a black or white answer.

In general then these Colorado diversions have been relatively unimportant up to the 1930s but since that time their significance has increased rapidly.

Their broader historical significance is threefold. First, they fit into the general struggle between the East and the West in the United States. This struggle, so long a part of the westward movement, is today seen in the great controversy over power and transportation. A second significance is that they reflect the spirit of cooperation which has been characteristic of the development of irrigation in the West. The Union Colony of 1870 demonstrated this spirit and so does the irrigation district which proposes to finance part of the Colorado-Big Thompson project today. And finally, transmountain water diversion in Colorado, which developed after the closing of the frontier, is part of the new westward movement in the United States. By aiding in the reclamation of land and in the development of society in the West, it is a vital factor in this new westward movement.

A History of Mining Machinery Manufacture In Colorado*

ELLSWORTH C. MITICK

THE WILLIAM A. BOX IRON WORKS

Born in England, William A. Box arrived in Colorado in 1896 hoping to relieve himself of the disease of tuberculosis. For several years he applied his mechanical skill working as foreman in Denver machine shops, until in 1902 he bought an interest with Frank Dillon in a tooling and repair shop at Nineteenth and Blake Streets, now the site of the Windsor Dairy, known as the Dillon-Box Machine Shop. This business cost them $4500. Box financed his share through the sale of a rock drill patent of a machine he had invented.

With an innate ability as an engineer, Box began designs on electric hoists, and introduced them soon after the first electric hoists had been developed in the West. Not confining himself merely to the field of machinery, he invented sirens and fire signals which were put into use by the Denver Fire Department.

The small $4500 investment of 1902 had been a successful one, and the Dillon-Box Iron Works steadily grew. Demand was great in western mining camps for the Box electric hoists.[1]

By 1910 Box dissolved his partnership with Dillon, and reorganized the company as the William A. Box Iron Works Company. For shops he bought out the large McFarlane factories at Thirty-Third and Blake Streets. Although he constructed no buildings in his new plant, the old ones were equipped with new machinery, including some of the largest lathe, boring mills, and gear cutters west of the Mississippi. The plant was equipped for heavy work, and turned out large hoists needed for big mine operations in the state.[2] Salesmen were sent throughout the world, and markets for Box hoists and other mining machinery manufactured by the Box Iron Works were found in Africa, Asia, Australia, and Russia.

From 1918 until the death of William Box in 1931 the number of men employed in the Box Iron Works numbered fifty to one hundred and fifty. During those fifteen years the company turned out $3,000,000 worth of mining machinery, sugar beet machinery, and other equipment. Largest and most successful of the machines was the electric hoist, nicknamed the "Leadville Hoist."

*Continued from the March, 1948, issue.—Ed.

[1] *Colorado Manufacturer and Consumer*, March, 1927, 31.

[2] Interview with Mrs. Elizabeth Box, July 22, 1946.

During the first World War, Box served as president of the Denver Ordnance Company, an organization of large Denver manufacturing concerns to promote the production of equipment needed by the government in conduct of the war. He acted as contact man with the government on contracts for the Denver companies participating in the program. Companies participating were the Shaw Iron Works, Vulcan Iron Works, Queen City Foundry, and the Box Iron Works. The first big wartime ships to leave port for European bases were powered by engines made by the Denver Ordnance Companies.[3]

The death in 1931 of William A. Box resulted two years later in legal proceedings, and the factory at Thirty-Third and Blake Streets, valued in 1931 at $213,000, passed into the hands of Mr. Fred H. Roberts in 1933. Mr. Harold Silver joined the company with Mr. Roberts in the following year, and today is in sole leadership of the very progressive and active Silver Engineering Works.

THE DORR COMPANY

The Dorr Company is not the only mining machinery concern manufacturing huge flotation machines or counter-current decantation for reclaiming the best possible percentages of ore in the milling process, but I have chosen here to introduce a few points relative to the processes.

After the metalliferous ore has been taken from the earth, it must be prepared for treatment by one of the standard, metallurgical, extraction processes, such as cyanidation, flotation, or leaching. In each process the ore must be ground to a certain degree of subdivision under controlled conditions.

Classifiers are operated in connection with the crushers or grinding mills, the fine overflows going to the so-called "slime treatment", and the coarse products going to a "sand treatment". The sands and slimes from the ore are thus given separate cyanidation.

Depending on the fineness of the grind, from 40 to 75 per cent of the gold or other metal in the ore dissolves in the grinding circuit. The pulp overflowing the classifier probably contains a greater proportion of water than is wanted in the succeeding agitation units. Therefore the excess rich solution is removed by thickening and sent to precipitation. Thickeners are circular tanks of comparatively shallow depth with mechanically actuated rakes in the bottom. The feed enters in the center, and is allowed to settle quickly. Clear solution overflows the top of the tank into a circular launder, while the heavier material settles uniformly. The rakes move this pulp continuously toward the center of the tank, and it discharges

[3] Interview with Mr. Gilbert Denton, Sr., July 3, 1947.

through an opening in the bottom. The rate of discharge is controlled by a diaphragm pump which also serves to elevate the pulp to the next tank in the circuit.

Following the first or primary thickener, fresh solution is usually added to the pulp, and it is pumped to the agitators. The purpose of these machines is to dissolve the gold remaining in the pulverized material. Agitators are circular tanks with stirring arms that prevent packing of settled solids on the tank bottom. The pulp feeds into the top of the tank, and circulates to the bottom, from which it is elevated to the top by airlifts and again distributed over the surface. Air is used to aid in pulp dilution. Pulp dilution is kept to a minimum to reduce the size of agitators and to prevent undue settlement of sands. If one large agitator were used there would be a danger of a fraction of the pulp being insufficiently mixed before being discharged. Therefore two or three smaller tanks of equivalent capacity are used to minimize the danger of "short circuiting". Following agitation, the dissolving process should be complete, and the pulp is again thickened to remove the valuable solution. Any solution removal process loses its effectiveness if the dissolution continues during this step.

If the discharge from the secondary thickener is 60 per cent solids, it means that 40 per cent of this pulp consists of solution which contains soluble gold and chemicals. It is necessary to save this material, so it must be separated from the barren rock. This separation may be done in two ways, by filtration and by counter-current decantation.

Counter-current decantation uses several separate thickeners in line, while the filtration process uses a drum-type filter mounted horizontally, and revolving slowly in a semi-circular tank. Vacuum is applied, and the particles adhere to the drum as it revolves. Moisture is sucked out. A water wash will remove the valuable constituents of the cake, while the filter cake is discharged to the waste dump. Thus the valuable minerals for which the mining process was begun in the first place have been extracted, and are ready for whatever use that particular metal may be needed.

The Dorr Company itself was incorporated in 1916, but its history goes back to the invention of the Dorr Classifier in 1904. The original form of this machine, the Model A, using a crank and rollers travelling on a track equipped with a switch to get the raking motion, was developed at the Lundberg, Dorr, and Wilson Mill at Terry, South Dakota, and made the difference between success and failure at that plant. Two machines, one an exact copy, at the Ernesting Mill at Mogollon, New Mexico, and one with a different form of motion, in Wyoming, were built on royalty contract shortly thereafter; and then arrangements were made with Skillin and

Richards Manufacturing Company of Chicago to manufacture them in a commercial way; at least to make the mechanisms, for a wood box, built at the plant was always used.[4] Among early installations were: the Real del Monte in Mexico, the United States Reduction and Refining Company, and the Golden Cycle Mine in Colorado.

The Dorr Thickener, developed in 1906 for the 300-ton mill of the Mogul Mining Company, proved its value from the start. This was an unusual instance of development as no test work at all was done or any small operation conducted. This thickener was 35 feet by 12 feet in size, and handled the whole slime flow of the mill.

Mr. Eames of Stearns-Roger Manufacturing Company assisted John Van Nostrand Dorr on the design for the thickener. In 1907 arrangements were made with Stearns-Roger to manufacture both Classifiers and Thickeners. The model B classifier, developed by H. Nevill of the company, with steel box, was adopted as the standard, although replaced a few years later by the Model C Classifier.

Mr. Dorr moved to Denver in 1907, and the company became the Dorr Cyanide Machinery Company in 1909. He retained control of both mills in the Black Hills and spent considerable time there. In those days very little sales effort was made by the company, but sales were good and increased as mines and mills became familiar with Dorr equipment. Advertising as a company policy was not introduced until 1910.[5]

The year of 1910, saw the expansion of Dorr interests and name around the world, as Mr. Dorr and William Russell went to London in the winter of 1910, and in January, 1911, continued on to South Africa for the inspection of Dorr machinery in use there. H. N. Spicer of the company staff started on a year's trip around the world in that year, visiting Australia, India, South Africa, and England, and established the Dorr Australian agency with N. Guthridge and Company of Sydney, Australia.

In 1912 came the addition of still another important machine to the cyanide process, the Dorr Agitator. Mr. Dorr had designed this originally for the Vulture Mill at Timmins, Ontario, but it was put in at the Ophir Mines Counter Current Decantation Plant at Ophir, Colorado, in that year.

Before 1912 the business had been almost entirely in cyaniding, with sales extending to British Columbia, Ontario, Central America, Ecuador, Bolivia, Peru, Russia, Japan, Finland, Australia, South Africa, Rhodesia, and West Africa outside American limits, and including Pennsylvania Steel, since absorbed by Bethle-

[4]Interview with E. C. Reybold, June 26, 1946.
[5]Notes of J. V. Nostrand Dorr, written in 1934, 7.

hem Steel, and the Pennsylvania Salt Company as American customers. Little had been done to win the copper, lead, and zinc interests to the use of Dorr machinery.[6]

The great copper mines at Anaconda, Montana, were building new slime plants, and tried out the Dorr Thickener in their experimental plants. This led to the development of the first type of Tray Thickener, the Anaconda or superposed type, and from that came the first closed type put in at the Homestake Mines. The original closed tray type came into use at several plants including the Tomboy Mine at Telluride, Colorado; the Aurora in Nevada; and the Tonopah-Belmont at Tonopah, Wisconsin. In 1915 the Golden Cycle and Mishler mines at El Tigre in Chihuahua, Mexico, developed independently the open type of thickener, which was, with the development of the self-supporting steel tray, a greatly improved machine; and its use was extended.

As a result of the trial of the Dorr Classifier at Anaconda in 1914, further changes were made in the machine, and the Model D was forthcoming.

The growing importance of eastern business was in evidence to the Dorr Company, and in 1913 Spicer left Denver to establish a New York Office in one room in that city. New industries were entered in that year by the company; these included rubber reclaiming, phosphate washing, salt washing, and tin washing. During that year, too, the European business steadily increased. The outbreak of war in 1914 was to check this growth temporarily.

The year 1914 saw the entry of Dorr into sanitary engineering through the loan of a small thickener to Mr. Pierce of the Sanitary District of Chicago for experimental purposes, and into the paint industry by a sale to the Golden Valley Ochre Company of Spain. Counter-current decantation business was strong in Canada and in the Joplin, Missouri, mining districts. At the San Francisco exhibit of 1915, Dorr equipment was displayed, and made a creditable showing.

Until 1915 the Stearns-Roger Company of Denver was doing all the manufacture on machine design for the Dorr Company, but the need was felt for a broader organization to handle the increasing business, and survey of the company and its business resulted in the incorporation of the Dorr Company under the laws of Colorado in 1916. W. A. Neill was made head of the newly-created engineering department. His experience as chief engineer for Allis-Chalmers' mining department had given him valuable experience for such a position in what was at the same time a new and old company. E. C. Reybold, who had helped Mr. Dorr get out circular

[6]Interview with E. C. Reybold.

letters in 1905, left his position with Hendrie and Bolthoff Manufacturing Company in Denver to take charge of the Dorr offices in Denver. Mr. Reybold still served in that capacity in 1947. Mr. Blomfield of the Golden Cycle Mill reduced his connection with that mine to part time, and took charge of development and consulting for Dorr, but returned again to the "Cycle" in 1917 to take complete charge there as general manager. There he developed the Bowl Classifier in 1917, broadening the scope of classification for the Dorr Company.

By 1919 Dorr equipment was serving the beet sugar industry, one showing a rapid growth in Colorado. Because business in zinc was good, an office was established that year in Joplin, Missouri; but the depression of 1921, brought an accompanying depression in mining, and the Joplin office was temporarily discontinued. The development of the flotation process more than compensated for the drop in cyaniding which accompanied gold depreciation during the war and after.

The company had equipped a small testing plant in Denver in 1916, and also one in New York, carrying out research in recovering nitrate from caliche, and in 1917 the Westport Mill was acquired and equipped to carry on all the research of the company except settling tests which were done in Denver, and cyaniding tests, made under arrangement with the Golden Cycle Mill.

Studying the application of Dorr methods to coal washing in both bituminous and anthracite fields brought the establishment of an office in Scranton, Pennsylvania, in 1918. The following year Dorr Thickeners were introduced into Cuba as part of the cane sugar processing.

A sanitary engineering department was established in 1920 to do work with tannery and later domestic sewage. That year saw the addition of a self-cleansing screen, known as the "Dorreo" screen, to the company products.

The Dorreo Pump, developed gradually from the old type of bilge pump, was a valuable addition to the company in 1920. Mr. Reybold was primarily responsible for the new diaphragm used in this pump.

Company fortunes throughout the following years followed the changes in business conditions throughout the country and world; however its business was not as greatly affected by frequent depressions in the mining world as were those companies devoted exclusively to the manufacture of mining machinery. Activity in beet and cane sugar industries, sanitary engineering, and allied metal industries covered a broad field broad enough to insure fairly continuous manufacturing activity.

Because of the constant introduction of new equipment, a large staff of draftsmen was kept constantly on the job, and by 1929 the Dorr Company in its Denver offices employed eighty draftsmen, the largest number of draftsmen ever employed by any company in Denver up to that time.[7]

On June 1, 1931, there occurred a union of the Dorr Company with the Oliver Company of Canada.[8] Canadian associations of the company had long been strong, Dorr equipment having entered Canada as early as 1909.

New fields entered by the company during the '20s and '30s included mercury, titanium, oil, nickel, insecticides, phosphates, bauxite, paper, rayon, diamonds, asphalt, alcohol, fertilizer, molybdenum, cadmium, sulphur, distilling, starch, vegetable oil, and acetic acid. Domestic offices spread to Chicago, Los Angeles, and Atlanta, and foreign offices to Paris, Berlin, Toronto, Tokyo, and the Hague. Mr. Dorr was frequently honored by professional colleagues for his achievements, of which the Classifier had been first. The award to him of the John Scott Medal of the Franklin Institute in 1916, of an honorary degree of Doctor of Science by Rutgers University in 1927, and the James Douglas Medal of the American Institute of Mining and Metallurgical Engineers in 1930 were made primarily for contributions he made to engineering practices since the turn of the century. His association as chemical experimenter with Thomas Edison from 1888-1890 was but one step in a career which stamps him as one of the leading engineers of the Twentieth centry.

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[7]Chamber of Commerce Bulletin, July 18, 1929, 3.
[8]*Canadian Engineer*, June 2, 1931, 7.